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ASSIGNMENT BOOKLET

SCN2231 Biology 30
Module 5 Assignment

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Please verify that preprinted label is for correct course and module.

Teacher's Comments

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Biology 30

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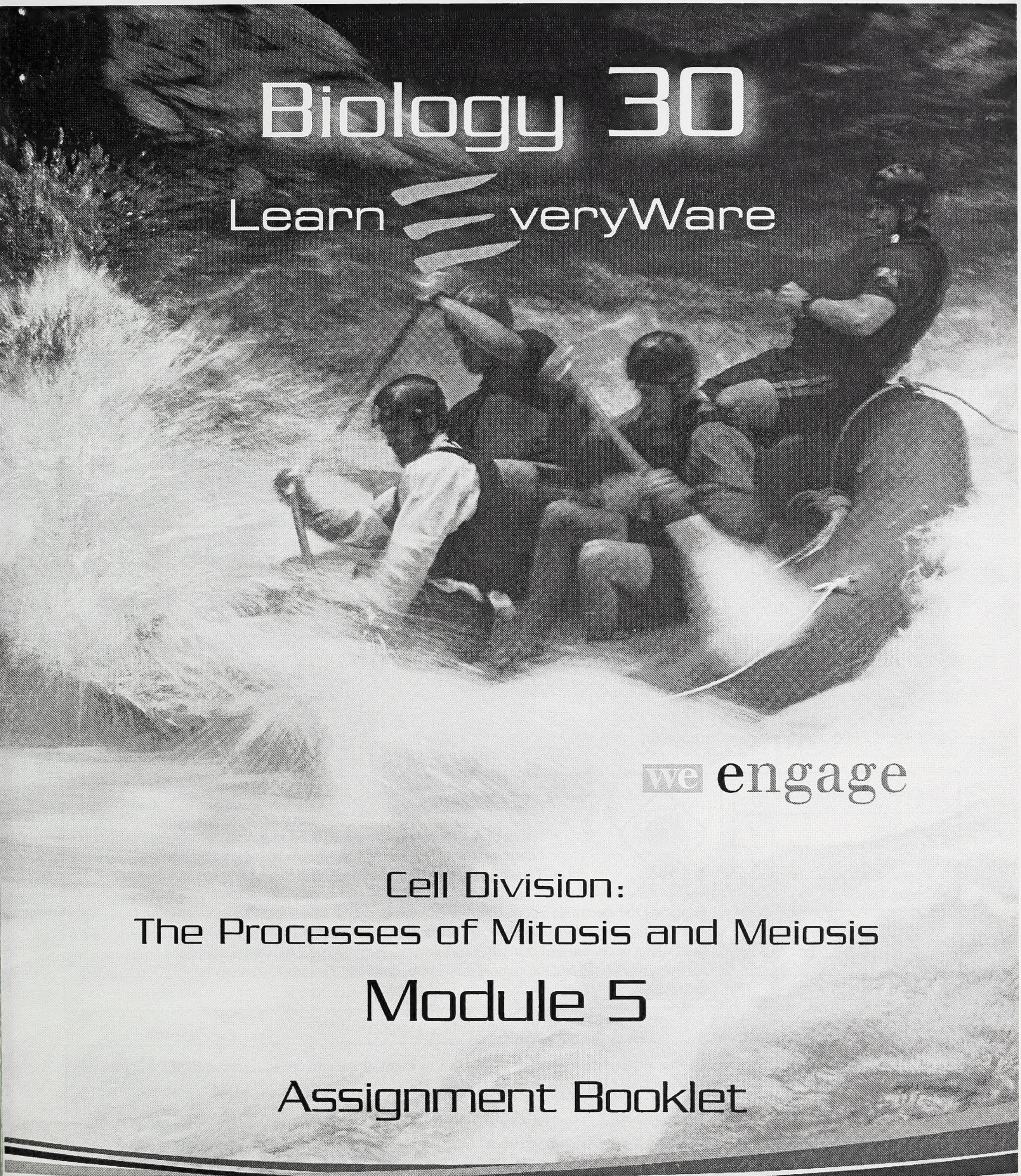

we engage

Cell Division:
The Processes of Mitosis and Meiosis

Module 5

Assignment Booklet

Rocky View School Division

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Calgary Board of Education

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FOR TEACHER'S USE ONLY

Summary

	Total Possible Marks	Your Mark
Lesson 1 Assignment	22	
Lesson 2 Assignment	10	
Lesson 3 Assignment	37	
Lesson 4 Assignment	40	
Lesson 5 Assignment	22	
Lesson 6 Assignment	20	
	151	

Teacher's Comments

Biology 30 Learn EveryWare
Module 5: Cell Division: The Processes of Mitosis and Meiosis
Assignment Booklet
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Teachers	✓
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Other	

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- Alberta Education, **http://www.education.gov.ab.ca**
- Learning Resources Centre, **http://www.lrc.education.gov.ab.ca**
- Tools4Teachers, **http://www.tools4teachers.ca**

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(22 marks)

MODULE 5: LESSON 1 ASSIGNMENT

This Module 5: Lesson 1 Assignment is worth 22 marks. The value of each assignment and each question is stated in the left margin.

Lesson 1 Assignment: Cell Division and Chromosomes

Choose Option A **or** Option B and submit your completed work to your teacher.

(22 marks)

Option A: Human Karyotype Lab

Observations

Use the “Copy Screen” icon in the simulation; and then print and paste the resulting karyotypes in the answer spaces below.

(2 marks) 1. Subject A’s karyotype

(2 marks) 2. Subject C’s karyotype – Klinefelter syndrome

(2 marks) 3. Subject D’s karyotype – Turner syndrome

(2 marks) 4. Subject E's karyotype – Down syndrome

Conclusions

Answer the following questions about the simulation you carried out.

(1 mark) 5. The X and Y chromosomes are called the sex chromosomes because they determine the gender of a person. How do the X and Y chromosomes compare?

(2 marks) 6. How does the karyotype of subject B compare with that of subject A? What is the gender of subject B?

(2 marks) 7. How does the karyotype of subject C differ from the normal human karyotype? How many total chromosomes does this individual have?

(2 marks) 8. Would you expect subject D to have the traits of a male or of a female? Why?

(5 marks) 9. What are the characteristics of Down syndrome?

(2 marks) 10. What kind of general information can you infer from karyotypes?

(22 marks)

Option B: "Investigation 16.A: Modelling a Karyotype," page 554

Attach your work for "Investigation 16.A," including your karyotype work and your answers to the "Procedure," "Analysis," and "Conclusion" questions to this Assignment Booklet. Make sure your work is clearly identified as being for Option B of the Lesson 1 Assignment.

MODULE 5: LESSON 2 ASSIGNMENT

This Module 5: Lesson 2 Assignment is worth 10 marks. The value of each assignment and each question is stated in the left margin.

(10 marks) Lesson 2 Assignment: The Cell Cycle and Cancer

(3 marks) 1. In your own words, compose a very short description of chemotherapy and briefly describe how it controls cancer cells.

(2 marks) 2. Explain why patients typically lose their hair when undergoing chemotherapy.

(1 mark) 3. What effect does the drug methotrexate initially have on cancerous cells that makes it an effective drug in cancer treatment?

(2 marks) 4. Why does the drug methotrexate lose its effectiveness over time?

(2 marks) 5. Why is there such concern about the loss of species diversity in plants around the world, and how is this connected with cancer treatment?

MODULE 5: LESSON 3 ASSIGNMENT

This Module 5: Lesson 3 Assignment is worth 37 marks. The value of each assignment and each question is stated in the left margin.

(37 marks) Lesson 3 Assignment: Mitosis

You should now have functional knowledge of each of the phases of mitosis. To observe the characteristics and features of mitotic cell division, you will complete a lab.

You have two options for completing this lab.

- **Option A:** Complete the online simulation "Cell Division Exploration," which is accessible from page 2 of Lesson 3.
- **Option B:** Complete "Investigation 16.B: Observing the Cell Cycle in Plant and Animal Cells" on page 559 in your textbook.

Option A

Complete the lab as directed, and then answer the following questions.

Observations

(4 marks) 1. Under the *Relative Duration of Phases* heading, you will need to follow the instructions to create a table that displays four sets of data. When the table is complete, click on "Export" in the simulation, and then choose "Edit" and "Paste" to copy the data into a word-processing document, which you will need to print and attach to this Assignment Booklet. If that does not work, you will need to recreate the table manually in the space below.

Calculations

(6 marks) 2. Based on the table you created for question 1, calculate the average number of cells in each of the four phases of mitosis as well as the number of cells in interphase and cytokinesis. Record those calculations below.

(12 marks) 3. The percentage of cells in each phase reflects the amount of time that a given cell spends in each of the phases. For example, if 10% of the cells you found were in prophase, and the cell cycle was 12 hours long, you would expect prophase to last about 1.2 hours ($12\text{ h} \times 0.10 = 1.2\text{ h}$). Based on your table, calculate how long each phase was for your sample and record those calculations below.

Conclusion

(4 marks) 4. Which phase of both the cell cycle and mitosis had the largest average number of cells? What can you conclude about the amount of time that cells spend in this phase?

(2 marks) 5. Which phase had the smallest average number of cells? What can you conclude about the amount of time that cells spend in this phase compared to the other phases?

(2 marks) 6. Based on your data, how long does an average cell spend in each of the six phases of the cell cycle?

(2 marks) 7. What part of mitosis takes the longest amount of time? What part was the shortest? Why do you think this is?

(2 marks) 8. In humans and most other living things, the duration of the cell cycle is closely regulated. What do you think would happen if cell division occurred in an uncontrolled way? If possible, discuss your ideas with your classmates and teacher and write a summary of your thoughts below.

(3 marks) 9. Prepare a table to compare and contrast the events of the cell cycle in plant cells and animal cells.

(37 marks)

Option B

Complete "Investigation 16.B: Observing the Cell Cycle in Plant and Animal Cells" on pages 559 and 560 in the textbook.

(4 marks) 1. Answer "Procedure" question 7.

(10 marks) 2. Answer "Procedure" question 8. Record your answer in the table.

(10 marks) 3. Answer "Procedure" question 9. Record your answer in the table.

(3 marks) 4. Answer “Analysis” question 1.

(3 marks) 5. Answer “Analysis” question 2.

(2 marks) 6. Answer “Analysis” question 3.

(2 marks) 7. Answer “Analysis” question 4.

(3 marks) 8. Answer “Analysis” question 5.

MODULE 5: LESSON 4 ASSIGNMENT

This Module 5: Lesson 4 Assignment is worth 40 marks. The value of each assignment and each question is stated in the left margin.

(40 marks) Lesson 4 Assignment: Meiosis

(26 marks) Part 1: Lab

1. Complete “Investigation 16.C: Modelling to Compare Meiosis and Mitosis” on page 568 of the textbook. As you develop your model comparing mitosis and meiosis, consult with your teacher for feedback on your work. Make sure that the model you choose to create can be easily shared through digital images or as a display. Consult with your teacher about submission options.

   Model design summary comparison = 8 marks
   Presentation to class = 8 marks
   Evaluation and communication:
      Self-evaluation = 4 marks
      Peer reflection = 2 marks
      Self-reflection = 2 marks
      Meiosis and gamete = 2 marks

   OR

   Develop a flow chart, podcast, slide show, poster, or other method of illustration approved by your teacher to illustrate your comparison of mitosis and meiosis. Remember to include details of what happens to the chromosomes in each process. Consult with your teacher about submission options.

(14 marks) Part 2: Discuss

(5 marks) D1. Consider the benefits of cloning for preserving endangered species or advancing livestock or agriculture. Weigh this against the risks or problems you have come to understand about the technique.

(5 marks) D2. Take a position on whether or not cloning should be encouraged in Canada. Defend your position and back it up with facts and information.

(2 marks) D3. Describe a societal issue and an ethical issue associated with cloning.

(2 marks) D4. Describe two technologies that could have been used during the cloning of Dolly.

Summarize your thoughts and those of the discussion below.

MODULE 5: LESSON 5 ASSIGNMENT

This Module 5: Lesson 5 Assignment is worth 22 marks. The value of each assignment and each question is stated in the left margin.

(22 marks) Lesson 5 Assignment: Cell Cycle Disorders and Genetic Testing

(13 marks) Part 1: Lab

Complete "Thought Lab 16.1: Nondisjunction Syndromes" on page 567 of your textbook. You will need to conduct research about one of the syndromes listed and present your findings in either print or electronic multimedia format. You will be awarded up to 5 marks for your presentation and up to an additional 8 marks for the "Analysis" questions, for a total of 13 marks.

Post your work on the discussion board. Share and compare your findings with those of other students.

Consult with your teacher about submission options.

(9 marks) Part 2: Stem Cell Research

You will need to conduct research to answer the following questions. Start with page 527 in your textbook or complete an Internet search using the search terms "cbc + archives + Canada's guidelines + stem cell research." This is valuable research, which you will be able to use later in the Reflect and Connect discussion.

(1 mark) 1. What are stem cells?

____

(2 marks) 2. Explain the unique characteristics that make stem cells suitable for the treatment of disease.

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(2 marks) 3. Explain the technology or the process by which stem cells are used to help in treating diseases like diabetes or Parkinson's disease.

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____

(2 marks) 4. Explain two technology problems that can exist with the use of stem cells when treating diseases.

(2 marks) 5. Describe two societal issues with the use of stem cells for the treatment of disease.

MODULE 5: LESSON 6 ASSIGNMENT

This Module 5: Lesson 6 Assignment is worth 20 marks. The value of each assignment and each question is stated in the left margin.

(20 marks)

Lesson 6 Assignment: Variation in Reproductive Strategies

Complete "Thought Lab 16.2: Comparing Reproductive Strategies" on page 579 of your textbook. Complete both the "Procedure" and "Analysis" parts of this lab. You will need to conduct research on two organisms and their chosen reproductive strategies. You will then create a short presentation comparing these strategies. Your presentation must include a table or another concept organizer. You may present your findings in either print or electronic multimedia format. Be sure to read the complete instructions on page 579 in your textbook. Consult with your teacher about submission options.

RUBRIC

	4 marks	3 marks	2 marks	1 mark
Content Quality (Presentation)	Both life cycles are clearly explained and compared.	One life cycle is complete and clearly explained, and the other is mostly done.	Both life cycles are outlined, but not compared.	Only one life cycle is done, or no advantages or disadvantages are given for the cycles.
Organization (Presentation)	Chart or diagram of life cycles is very logical, clear, and accurate.	Chart or diagram is mostly logical, clear, and accurate.	Chart or diagram is mostly accurate.	Chart or diagram is disorganized and inaccurate.
Quality (Presentation)	Presentation is clear, organized, and creative.	Presentation is clear and organized.	Presentation is understandable.	Presentation is not clear or not organized.
Questions ("Analysis")	Student explained if there is a better strategy and accounted for any differences among the groups.	Student explained the better strategy, but did not mention any differences among groups.	Student indicated there was a better strategy, but did not explain why.	No "Analysis" questions were done.
New Species ("Analysis" question 3)	Student explains a form of reproduction, provides a clear illustration or description of the life cycle, and explains the benefits of the form of reproduction.	Student only provides two of the items requested for "Analysis" question 3.	Student only provides one of the items requested for "Analysis" question 3.	A new organism was created, but little was explained or illustrated.

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